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Oak Graining.

OIL graining color is made in the following manner: Procure some finely ground burnt umber and raw sienna (or Vandyke brown and raw sienna, if a dark oak is required), and thin with equal parts of linseed oil and turpentine. Add a large quantity of patent dryers to make it stand the comb. The color is now ready for use. The graining color is brushed over the work in an ordinary manner with a pound brush; care being taken not to put too much color on, or else it is very liable to look dirty. A dry dusting brush is now used to stipple with; which, if properly done, will distribute the color evenly. It is now ready for combing. Take first a medium or coarse cut gutta-percha comb, and draw it down one side of the panel, then use a finer one to complete it. This comb will leave the marks of the grain in clear, unbroken lines, from top to bottom of the panel. We now take a fine steel comb, and go over the whole of the previous combing; but, in drawing this comb down, we either move it in a slanting or diagonal direction across the previous combing, or draw it down with a quick and short wavy motion and curl. Both the former and the latter motion will break up the long lines left by the gutta-percha comb into short bits, which, of course, represent the pores or grains of the real wood. Next take out the lights of figuring or veining. This is effected by means of a piece of wash leather, held tightly over the thumb nail. Every time a few lights are wiped out the leather should be moved slightly, so that the same part of the leather will not be used twice, thus insuring clean work. There are various methods of doing this, but they require much more practice. When the figures are all wiped out they will require to be softened. By softening we mean the imitation of those half shades seen upon and about the figures in the real wood. This is imitated by doubling a piece of wash leather into a small roll, and with the side of this the grain is partly wiped away or softened. Care should be taken not to wipe off the whole of the grain. If you had a piece of real wood to look at occasionally it would help you a great deal. As soon as the oil color is dry it should be overgrained. This is effected in water color. Next go over the work with a bit of sponge and soap to prevent it cissing. Before laying on the overgraining wash out the sponge and wipe the work. It is now ready to receive the color. Grind up finely a little Vandyke brown in water, and dilute it with equal proportions of table-beer and water. It is now ready. Take a flat hog-hair brush, three or four inches wide, dip it in the color, and draw it over the work—in most cases in the direction

of the combing—but occasionally crossing it. The hair of the brush being thinly placed will separate in patches, and hence the color will be deposited in streaks, resembling the natural gradations which the wood presents. If you have not a brush of this kind you may use a sponge to put in the streaks and soften off. When dry, varnish in the usual way.

The Care of Shop Tools.

THE *American Machinist* has some important suggestions concerning the advantage of care and system in the treatment of shop tools. First cost of tools seldom represents their ultimate cost, whether it becomes necessary to repair them or not. If a good mechanic makes a tool last a year in constant usage, while his careless neighbor uses up one of the same kind in six months, the cost of the latter should be accounted twice that of the former. When repairs are made their value must be added in computing the whole cost of the tool.

One primary reason why some shops can show a greater profit on a given amount of work is because they get more service out of their tools. This is just as evident when tools are cheap as when they are dear, for the products of mechanical labor fluctuate the same as the first cost of tools; and if a large part of the income of business goes for working tools and repairs to the same, balances on the right side of the ledger are likely to be diminutive, if indeed they appear at all. It is the first requisite that tools and machines should be adapted to the work to be performed. Fine tools should not be used on heavy, coarse work. They must also be kept in good working order, cutting edges well sharpened and bearing surfaces lubricated, shafting kept well aligned, pulleys balanced, belts kept clean and pliable and at the correct tension, rust prevented, emery wheels and grindstones trued up, and dirt kept out of all wearing parts.

Machines should be mounted on stable foundations and run neither above nor below the proper speed required to do the work. Small tools demand as much care as large ones, and a careless or inexperienced workman will often spoil more than the amount of his wages in files, drills, chucks, reamers, taps, dies, calipers, wrenches, and the like, unless closely looked after by the master mechanic. It is therefore very essential, in order to insure proper care of tools, that workmen know just how to use them. All small tools should be laid away systematically in a dry place when not in use. In large shops a room should be set apart for this purpose, and a man detailed to take charge of it and keep the tools in good working order. There is no part of a large machine

shop from which an outsider can form a better judgment of the general management than by an observation of the tool-room. The best economy is established by securing none but the best tools at the outset, for in the long run they will be found the cheapest. As a rule, it is expensive trying experiments by purchasing tools of new and untried patterns or material. New machines and tools are often constructed so as to leave no reasonable doubt of their successful operation, but this is not invariably the case. It is always safe to buy those about the working of which there is no doubt. Second-hand machinery can often be obtained in good order at very low prices, if the purchaser has extra time at his disposal to look it up, but when machinery is much worn, its value is questionable at any price. It is not only easier, but a greater satisfaction, to take care of good tools than of poor ones.

Making Wooden Pulleys.

A PULLEY over twenty-four inches in diameter should be built on a spider; all under that size can be made on a wood centrepiece about two inches thick, having a cast-iron flange, say eight inches in diameter for a twenty-inch pulley, with a hub and boss about three inches long. Four bolt holes should be made through the flange for bolting to wood centre. The latter should be a nice fit on the shaft, with key seat the same as for an iron pulley. After preparing the centerpiece by planing smooth and straight, make a templet, the length being about one sixth or one eighth of the diameter and two inches wide. By this mark out the amount of stuff for the required width of the face. The lumber should be about seven eighths or an inch thick, sawed out to the same circle as centerpiece. Plane straight and smooth, and make the butt joints a perfect fit; glue and nail on. If a flange is desired on each edge to keep the belt from running off, make the outside layer a little wider and allow it to lap over the face. Put the pulley into a lathe and turn it up. Thus made, it will be durable and will not easily break.—*B. J. Donaway in Scientific American.*

The Proper Speed for Circular Saws.

THE *Lumberman's Gazette* says: "Nine thousand feet per minute—that is nearly two miles per minute for the rim of a circular saw to travel may be laid down as a rule. For example: A saw 12 inches in diameter, or 3 feet around the rim, 3000 revolutions; 24 inches in diameter, or 6 feet around the rim, 1500; 3 feet in diameter, or 9 feet

around the rim, 1000 revolutions; 4 feet in diameter, or 12 feet around the rim, 750 revolutions; 5 feet in diameter, or 15 feet around the rim, 600 revolutions. The rim of the saw will run a little faster than this reckoning, on account of the circumference being more than three times as large as the diameter. Shingle or some other saws, either riveted to a cast-iron collar or very thick at the centre and thin at the rim, may be run with safety at a greater speed."

Useful Items for Office and Shop.

CEMENT FOR WOOD AND IRON.—A foreign journal speaks of a cement made of oxide of lead and concentrated glycerine, which unites wood to iron with remarkable efficiency. The composition is insoluble in acids, is unaffected by the action of heat, sets rapidly, and acquires an extraordinary hardness.

A SOLUTION of four ounces of sandarac, one ounce gum mastic, and four ounces shellac, in one pound of alcohol, to which two ounces oil of turpentine is added, can be recommended as a varnish over stained woods.

POSTAGE-STAMP MUCILAGE.—The following is said to be the formula for the mucilage used on the United States postage stamps: Dextrine, two ounces; acetic acid, one ounce; water, five ounces; alcohol, one ounce. Add the alcohol to the other ingredients when the dextrine is completely dissolved.

VARNISH for indoor painting is made by melting six parts of gum copal and adding two and a half parts of linseed oil. When cold the yield is $6\frac{1}{8}$ parts of concentrated varnish, having the consistence of wax, as the loss on the gum amounts to one and four fifth parts. One part of this concentrated varnish mixed in the cold with one part of oil of turpentine yields two parts of very good varnish for inside work.

STEEL RUST.—According to the *Chemiker Zeitung*, articles of steel which have become rusty may be cleansed by brushing with a paste made up of thirty parts cyanide of potassium, thirty parts curd soap, sixty parts of precipitated chalk, and a sufficiency of water. Our contemporary adds that great care is required in preparing and using this poisonous mixture.

IMITATION MAHOGANY.—Brush over the wood with common ink; when that is dry brush it over with dragon's-blood mixed with methylated spirit in the proportion of one ounce dragon's-blood to one half pint of the methylated spirit. When that is dry, varnish with spirit varnish. Cost of dragon's-